

## PATENT ABSTRACTS OF JAPAN

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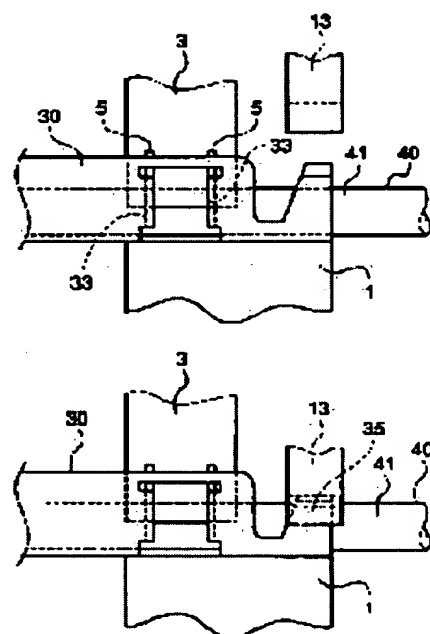
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**(54) ELECTRIC WIRE CONNECTING METHOD FOR PRESSURE WELDING TERMINAL AND ELECTRIC WIRE PRESSURE WELDING DEVICE****(57)Abstract:**

**PROBLEM TO BE SOLVED:** To resolve the nonconformities such as the scraping or severance of a core wire occurring when a covered electric wire is pressed-in, to increase the contact pressure of a pressure welding blade after it is pressed-in and to improve continuity reliability by applying a process for pressing the covered electric wire into a slot formed by the pressure welding blade and a process for caulking an electric wire hold section on the cover section of the covered electric wire with staggered timings.

**SOLUTION:** A covered electric wire 40 is arranged on a pressure welding terminal 30 supported by a base section 1, the pressure welding 3 of an electric wire pressure welding device is lowered prior to a caulking punch 13 to press the covered electric wire 40 into a slot depth section, the cover section 41 of the covered electric wire 40 is cut out by a pressure welding blade 33, and a core wire is conducted to the pressure welding blade 33. The pressure welding punch 3 keeps the covered electric wire 40 at the pressed-in state, the caulking punch 13 is lowered, its guide wall face is kept in slide contact with the tip of an electric wire hold section 35, the electric line hold section 35 is folded to be gradually squeezed to the inside and caulked on the cover section 41, and the pressure welding terminal 30 firmly fixes and connects the covered electric wire 40.



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CLAIMS

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[Claim(s)]

[Claim 1] While tearing apart the covering section and aiming at flow connection with an internal core wire by pressing a cable fit in a pressure-welding edge in the wire-jointing method of the solderless terminal which carries out fixed connection of the aforementioned cable in total the electric wire attaching part which approached the aforementioned pressure-welding edge and were formed successively -- the covering section top of the aforementioned cable -- \*\* -- The wire-jointing method of the solderless terminal characterized by being able to shift the process and the aforementioned electric wire attaching part which press the aforementioned cable fit into the slot formed with the aforementioned pressure-welding edge, and performing [ the attaching part ] caulking \*\*\*\*\* for timing on the covering section of the aforementioned cable.

[Claim 2] The pedestal which supports a solderless terminal from a lower part. It is punch for caulking \*\*\*\*\* about the electric wire attaching part of the aforementioned solderless terminal approached and formed successively by the aforementioned pressure-welding edge on the covering section of the pressure-welding punch which descends from the upper part to the solderless terminal on a pedestal, and presses a cable fit in the pressure-welding edge of this solderless terminal, and the aforementioned cable. It is electric wire pressure-welding equipment equipped with the above, and is characterized by for aforementioned pressure-welding punch preceding and descending to the aforementioned punch for caulking, and for the aforementioned punch for caulking descending still in the state in the state where the aforementioned cable was pressed fit in the pressure-welding edge, and performing caulking of the aforementioned electric wire attaching part.

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] When this invention presses a cable fit to the pressure-welding edge of a solderless terminal in detail about the wire-jointing method of a solderless terminal, and electric wire pressure-welding equipment, it relates to the wire-jointing method of a solderless terminal and electric wire pressure-welding equipment which were improved so that the core wire inside an electric wire could be deleted and \*\*\*\*\* might be prevented.

[0002]

[Description of the Prior Art] Since the covering section in a cable edge strips off a solderless terminal, it omits work at the time of a wire jointing and can carry out terminal strapping of the internal core wire, while it is suitable for automation, it can reduce manufacture cost. Namely, if the thing of an indication is shown and explained to JP,10-92480,A at drawing 4 , a solderless terminal 30 The contact 31 which folding of the metal plate of one sheet is carried out, and it is formed, and it is located in the end side installed in the direction of an axis, and the terminal metallic ornaments of the non-illustrated other party contact, and aims at an electric flow, The pressure-welding edge 33 which will tear apart the covering section 41 of a cable 40 and will carry out flow contact with a core wire 43 if the both-sides wall formed in the shape of a cross-section KO character is made crooked in the inner direction so that it may counter mutually and a cable 40 is pushed in, It is located in the other end side of the direction of an axis contiguous to this pressure-welding edge 33, and has the electric wire attaching part 35 which bends both both-sides walls inside and carries out fixed connection of the cable 40 for the covering section 41 by caulking \*\*\*\*\*.

[0003] And it is in the state [ back / wearing ] which has arranged in the above-mentioned official report in two or more terminal hold rooms 45 installed by the connector housing 43 as shown in drawing 5 , and has arranged the cable 40 for the solderless terminal 30 in front of a wire jointing on a solderless terminal 30 beforehand. By inserting female mold (Annville) 47 in the bottom position corresponding to the electric wire attaching part 35, attaching from the upper part, and dropping a fixture (punch) 49 Pressing fit to the pressure-welding edge 33 of a cable 40 and caulking to the covering section 41 top of the electric wire attaching part 35 are performed in simultaneous package, and the solderless terminal 30 is made to make flow connection of the cable 40. Namely, generally, the attachment fixture 49 equips the pressure-welding punch for electric wire pressing fit, and the punch for caulking of electric wire fixation in one, and, simultaneously with pressing fit to the pressure-welding edge 33 of a cable 40, is performing caulking of the electric wire attaching part 35. By use of such an attachment fixture 49, the wire-jointing process in automation was able to be simplified, and connection working hours were able to be shortened, and the cable 40 was able to be efficiently connected to the solderless terminal 30.

[0004]

[Problem(s) to be Solved by the Invention] however, the electric wire attaching part 35 which plays a role of strain relief as are shown in drawing 6 (a) and (b) and the wire-jointing method and electric wire pressure-welding equipment by the conventional attachment fixture mentioned above show to pressing

fit, simultaneously drawing 7 (a) to the pressure-welding edge 33 of a cable 40, and (b) -- \*\* -- since it was in total, fault which is mentioned later arose That is, as shown in drawing 6 (b), to deforming so that a right-and-left side attachment wall may open slightly to the method of outside by pressing [ of an electric wire 40 ] fit, the bending force by the side of the method of the inside of \*\*\*\*\* acts the electric wire attaching part 35 on an opposite direction, as shown in drawing 7 (b), and if it is in the pressure-welding edge 33, it works so that the aperture of this right-and-left side attachment wall may be prevented. In order that the influence by this bending force may act on the pressure-welding edge 33 of a part near the electric wire attaching part 35 notably especially, it becomes easy to disconnect the core wire of the cable pressed fit. That is, it is because a cable is pressed fit forcibly halfway in the state where follow a cable and a pressure-welding edge does not open smoothly to the method of outside. [0005] this invention was made in view of the above-mentioned situation, can delete the core wire which happens at the time of pressing [ of a cable ] fit, cancels un-arranging, such as \*\*\*\*\* , and it aims at offering the wire-jointing method of a solderless terminal and electric wire pressure-welding equipment which raise the contact pressure of the pressure-welding edge after pressing fit, and moreover raise flow reliability.

[0006]

[Means for Solving the Problem] The wire-jointing method of the solderless terminal concerning this invention for attaining the above-mentioned purpose While tearing apart the covering section and aiming at flow connection with an internal core wire by pressing a cable fit in a pressure-welding edge In the wire-jointing method of the solderless terminal which carries out fixed connection of the aforementioned cable in total the electric wire attaching part which approached the aforementioned pressure-welding edge and were formed successively -- the covering section top of the aforementioned cable -- \*\* -- It is characterized by being able to shift the process and the aforementioned electric wire attaching part which press the aforementioned cable fit into the slot formed with the aforementioned pressure-welding edge, and performing [ the attaching part ] caulking \*\*\*\*\* for timing on the covering section of the aforementioned cable.

[0007] And in case performing pressing [ of a cable ] fit in advance of caulking of an electric wire attaching part in order to shift timing with caulking \*\*\*\*\* for the process and electric wire attaching part which press a cable fit according to the above-mentioned method, then a cable are pressed fit in a pressure-welding edge, the deformation prevention factor of the pressure-welding edge by the electric wire attaching part is canceled, and a pressure-welding edge follows pressing [ of a cable ] fit and is opened easily to the method of outside.

[0008] Moreover, the electric wire pressure-welding equipment concerning this invention for attaining the above-mentioned purpose The pedestal which supports a solderless terminal from a lower part, In the electric wire pressure-welding equipment which possesses the punch for caulking \*\*\*\*\* for the electric wire attaching part of the aforementioned solderless terminal approached and formed successively by the aforementioned pressure-welding edge on the covering section of the pressure-welding punch which descends from the upper part to the solderless terminal on a pedestal, and presses a cable fit in the pressure-welding edge of this solderless terminal, and the aforementioned cable It is characterized by for aforementioned pressure-welding punch preceding and descending to the aforementioned punch for caulking, and for the aforementioned punch for caulking descending still in the state in the state where the aforementioned cable was pressed fit in the pressure-welding edge, and performing caulking of the aforementioned electric wire attaching part.

[0009] and -- since it will deform so that a pressure-welding edge may open a little to the method of outside in connection with the insertion pressure at this time if according to the above-mentioned composition pressure-welding punch precedes and descends to the punch for caulking and presses a cable fit in a pressure-welding edge -- a core wire -- it can delete -- etc. -- it loses and a cable can be inserted in fitness to the slot deep part of a pressure-welding edge Moreover, after pressing [ of a cable ] fit, it is added so that the bending force by the side of the inner direction where the punch for caulking acts on a pressure-welding edge with an electric wire attaching part by \*\*\*\*\*'s at caulking of this electric wire attaching part may raise the contact pressure of a pressure-welding edge. Thereby, the

pressure-welding edge which the solderless terminal opened comes to be returned to an initial state, and its contact reliability improves. Furthermore, the punch for caulking is \*\*\*\*\* about an electric wire attaching part still in the state in the state where pressure-welding punch pressed the cable fit. Thereby, where the relief of the cable by pressure-welding punch is prevented, caulking \*\*\*\*\* can do a cable good, and the punch for caulking is \*\*.

[0010]

[Embodiments of the Invention] Hereafter, the wire-jointing method of the solderless terminal concerning this invention and the gestalt of suitable operation of electric wire pressure-welding equipment are explained in detail based on a drawing. Drawing 1 is the outline decomposition perspective diagram showing 1 operation gestalt of the electric wire pressure-welding equipment concerning this invention. In addition, this operation gestalt shall also explain the wire-jointing method of a solderless terminal based on the electric wire pressure-welding equipment concerning this invention. Moreover, to the same member as the conventional example, and a part, explanation is omitted using the same sign.

[0011] In drawing 1, electric wire pressure-welding equipment 10 equips the pedestal 1 which supports a solderless terminal 30, and the pressure-welding punch 3 and the punch 13 for caulking which descends from the upper part to the solderless terminal 30 on a pedestal 1, and connects a cable 40, and consists of lower parts.

[0012] A pedestal 1 is the plinth (female mold) whose installation of a solderless terminal 30 was enabled, and abbreviation coincidence is carried out at the inferior-surface-of-tongue configuration of a solderless terminal 30, and by the part corresponding to the electric wire attaching part 35 of a solderless terminal 30 at least, the upper surface 2 is formed in the curved surface what minute in order to make good the caulking configuration of the electric wire attaching part 35. In addition, by this example, the pedestal 1 is formed only in the size which can lay the pressure-welding edge 33 and the electric wire attaching part 35 of a solderless terminal 30 while being fixed. However, a pedestal 1 may be structure which supports the whole including the contact 31 (refer to drawing 4) of a solderless terminal 30. Moreover, a pedestal may be a size corresponding to the electric wire attaching part, and may be in the state with which the terminal hold room of connector housing which it is prepared possible [ movement ] and a solderless terminal does not illustrate was equipped, and may be structure which advances into the lower part position corresponding to the electric wire attaching part.

[0013] A solderless terminal 30 is equipped with two or more pairs of pressure-welding edges 33 which made a part of both right-and-left side attachment walls that made the metal plate the shape of a cross-section KO character by folding crooked in the inner direction as usual, and forms the slot 37 which tears apart the covering section 41 by pressing [ of a cable 40 ] fit between the tips of the pressure-welding edge 33 which counters mutually. Moreover, a solderless terminal 30 is equipped with the electric wire attaching part 35 which the pressure-welding edge 33 was approached [ attaching part ] and made the terminal back end section formed successively stand up possible [ bending of a right-and-left side attachment wall ].

[0014] Pressure-welding punch 3 is the punch which descends from the upper part to the solderless terminal 30 on a pedestal 1, and can press a cable 40 fit in the slot 37 of the pressure-welding edge 33, and two or more relief grooves 5 into which the pressure-welding edge 33 advances when it descends are installed successively toward the upper part in the position corresponding to the pressure-welding edge 33 from the inferior surface of tongue 9. Moreover, the press crevice 7 which presses a cable 40 in contact with the peripheral face of a cable 40 in an inferior surface of tongue 9 is installed in the relief groove 5 and the right-angled direction.

[0015] When the punch 13 for caulking descended from the upper part to the solderless terminal 30 on a pedestal 1, is caulking \*\*\*\*\* and descends the electric wire attaching part 35 of a solderless terminal 30 on the covering section 41 of a cable 40, it establishes the guidance wall 15 which bends the electric wire attaching part 35 to the inner direction gradually, and it is equipped with the crevice 17 of the shape of a mountain type which sticks the electric wire attaching part 35 by pressure on the covering section 41.

[0016] The pressure-welding punch 3 and the punch 13 for caulking which were mentioned above are formed independently possible [ movement ], respectively, in this example, pressure-welding punch 3 precedes characteristic composition of this operation gestalt with the punch 13 for caulking, and it descends.

[0017] Next, with reference to both drawing 2 and drawing 3, the wire-jointing method of a solderless terminal and an operation are described. First, in the state where the cable 40 has been arranged above the solderless terminal 30 supported by the pedestal 1, pressure-welding punch 3 precedes and descends to the punch 13 for caulking, and electric wire pressure-welding equipment 10 presses a cable 40 fit to a slot deep part, as shown in drawing 2 (a). Thereby, the covering section 41 is torn apart with the pressure-welding edge 33, and, as for a cable 40, a core wire 43 is \*\*\*\*(ed) with the pressure-welding edge 33.

[0018] When this pressure-welding punch 3 descends, as shown in drawing 3 (a), the right-and-left side attachment wall of the part corresponding to this pressure-welding edge 33 comes to open the pressure-welding edge 33 a little to the method of outside with pressing [ of a cable 40 ] fit. By this, the pressure-welding edge 33 will have \*\*\*\*\* which is the grade which can tear apart the covering section 41 at the same time it makes penetration of a cable 40 ease. Therefore, \*\*\*\* of a core wire 43 and the pressure-welding edge 33 is performed good at the same time it can delete a core wire 43 and \*\*\*\*\* is prevented.

[0019] Subsequently, it bends so that it may be standing it still still in the state in the state pressure-welding punch 3 having pressed the cable 40 fit, and the punch 13 for caulking descending, and making the nose of cam of the electric wire attaching part 35 \*\*\*\* in the 15th page of the guidance wall as shown in drawing 2 (b) and the electric wire attaching part 35 may be narrowed down inside gradually, and electric wire pressure-welding equipment 10 is \*\*\*\*\* on the covering section 41. Thereby, a solderless terminal 30 carries out fixed connection of the cable 40 firmly.

[0020] As this punch 13 for caulking descends and solves and it is shown in drawing 3 (b), the bending force inside the electric wire attaching part 35 joins the pressure-welding edge 33, and the pressure-welding edge 33 is closed to the inner direction. Thereby, the contact pressure which the pressure-welding edge 33 comes to be returned to an initial state from the state opened a little by pressing [ of a cable 40 ] fit, and contacts a core wire 43 comes to be raised. Therefore, the contact reliability of a solderless terminal 30 of the pressure-welding edge 33 improves. Moreover, since it was prepared with the downward state in which pressure-welding punch 3 pressed the cable 40 fit and the relief of a cable 40 is prevented when this punch 13 for caulking descends, as for the punch 13 for caulking, caulking \*\*\*\*\* can do a cable 40 good. In addition, you may be the structure which descends in [ both punch ] abbreviation simultaneous since \*\*\*\*\* timing should just be slightly shifted in the electric wire attaching part when this invention is not limited only to such a mode although it says that the punch for caulking descends after the state where explanation top and pressure-welding punch descended completely by the wire-jointing method of a solderless terminal, and pressing a cable fit in a pressure-welding edge in short.

[0021] Although stated by the wire-jointing method in the above-mentioned operation gestalt as composition which precedes a pressing process with a caulking process and performs the pressing process to the pressure-welding edge of a cable, and the caulking process by the electric wire attaching part, as long as a pressure-welding edge opens good in the case of a pressing process, this invention may not be limited to such process timing, and may be pressed fit after caulking. However, contact pressure recovery of the pressure-welding edge which acts in connection with caulking of an electric wire attaching part in this case is not expectable.

[0022]

[Effect of the Invention] Since a pressure-welding edge is easily opened without the deformation prevention force of a pressure-welding edge acting in case a cable is pressed fit in a pressure-welding edge since it is carried out by a caulking process shifting an electric wire attaching part from the process which presses a cable fit in a pressure-welding edge in timing on the covering section according to the wire-jointing method of the solderless terminal of this invention, and electric wire pressure-welding

equipment, the core wire which happens at the time of pressing [ of a cable ] fit can be deleted, and it can cancel un-arranging, Moreover, after pressing a cable fit in a pressure-welding edge, the deformation force by caulking of an electric wire attaching part can act on a pressure-welding edge so that the contact pressure of a pressure-welding edge may be raised, and it can raise contact reliability with a core wire. Furthermore, since it precedes and the descending pressure-welding punch prevents the relief of a cable, an electric wire attaching part is made [ the punch for caulking ] by caulking \*\*\*\*\* good on the covering section.

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**TECHNICAL FIELD**

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[The technical field to which invention belongs] When this invention presses a cable fit to the pressure-welding edge of a solderless terminal in detail about the wire-jointing method of a solderless terminal, and electric wire pressure-welding equipment, it relates to the wire-jointing method of a solderless terminal and electric wire pressure-welding equipment which were improved so that the core wire inside an electric wire could be deleted and \*\*\*\*\* might be prevented.

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PRIOR ART

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[Description of the Prior Art] Since the covering section in a cable edge strips off a solderless terminal, it omits work at the time of a wire jointing and can carry out terminal strapping of the internal core wire, while it is suitable for automation, it can reduce manufacture cost. Namely, if the thing of an indication is shown and explained to JP,10-92480,A at drawing 4, a solderless terminal 30 The contact 31 which folding of the metal plate of one sheet is carried out, and it is formed, and it is located in the end side installed in the direction of an axis, and the terminal metallic ornaments of the non-illustrated other party contact, and aims at an electric flow, The pressure-welding edge 33 which will tear apart the covering section 41 of a cable 40 and will carry out flow contact with a core wire 43 if the both-sides wall formed in the shape of a cross-section KO character is made crooked in the inner direction so that it may counter mutually and a cable 40 is pushed in, It is located in the other end side of the direction of an axis contiguous to this pressure-welding edge 33, and has the electric wire attaching part 35 which bends both both-sides walls inside and carries out fixed connection of the cable 40 for the covering section 41 by caulking \*\*\*\*\*.

[0003] And it is in the state [ back / wearing ] which has arranged in the above-mentioned official report in two or more terminal hold rooms 45 installed by the connector housing 43 as shown in drawing 5, and has arranged the cable 40 for the solderless terminal 30 in front of a wire jointing on a solderless terminal 30 beforehand. By inserting female mold (Annville) 47 in the bottom position corresponding to the electric wire attaching part 35, attaching from the upper part, and dropping a fixture (punch) 49 Pressing fit to the pressure-welding edge 33 of a cable 40 and caulking to the covering section 41 top of the electric wire attaching part 35 are performed in simultaneous package, and the solderless terminal 30 is made to make flow connection of the cable 40. Namely, generally, the attachment fixture 49 equips the pressure-welding punch for electric wire pressing fit, and the punch for caulking of electric wire fixation in one, and, simultaneously with pressing fit to the pressure-welding edge 33 of a cable 40, is performing caulking of the electric wire attaching part 35. By use of such an attachment fixture 49, the wire-jointing process in automation was able to be simplified, and connection working hours were able to be shortened, and the cable 40 was able to be efficiently connected to the solderless terminal 30.

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EFFECT OF THE INVENTION

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[Effect of the Invention] Since a pressure-welding edge is easily opened without the deformation prevention force of a pressure-welding edge acting in case a cable is pressed fit in a pressure-welding edge since it is carried out by a caulking process shifting an electric wire attaching part from the process which presses a cable fit in a pressure-welding edge in timing on the covering section according to the wire-jointing method of the solderless terminal of this invention, and electric wire pressure-welding equipment, the core wire which happens at the time of pressing [ of a cable ] fit can be deleted, and it can cancel un-arranging. Moreover, after pressing a cable fit in a pressure-welding edge, the deformation force by caulking of an electric wire attaching part can act on a pressure-welding edge so that the contact pressure of a pressure-welding edge may be raised, and it can raise contact reliability with a core wire. Furthermore, since it precedes and the descending pressure-welding punch prevents the relief of a cable, an electric wire attaching part is made [ the punch for caulking ] by caulking \*\*\*\*\* good on the covering section.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] however, the electric wire attaching part 35 which plays a role of strain relief as are shown in drawing 6 (a) and (b) and the wire-jointing method and electric wire pressure-welding equipment by the conventional attachment fixture mentioned above show to pressing fit, simultaneously drawing 7 (a) to the pressure-welding edge 33 of a cable 40, and (b) -- \*\* -- since it was in total, fault which is mentioned later arose That is, as shown in drawing 6 (b), to deforming so that a right-and-left side attachment wall may open slightly to the method of outside by pressing [ of an electric wire 40 ] fit, the bending force by the side of the method of the inside of \*\*\*\*\* acts the electric wire attaching part 35 on an opposite direction, as shown in drawing 7 (b), and if it is in the pressure-welding edge 33, it works so that the aperture of this right-and-left side attachment-wall may be prevented. In order that the influence by this bending force may act on the pressure-welding edge 33 of a part near the electric wire attaching part 35 notably especially, it becomes easy to disconnect the core wire of the cable pressed fit. That is, it is because a cable is pressed fit forcibly halfway in the state where follow a cable and a pressure-welding edge does not open smoothly to the method of outside. [0005] this invention was made in view of the above-mentioned situation, can delete the core wire which happens at the time of pressing [ of a cable ] fit, cancels un-arranging, such as \*\*\*\*\*, and it aims at offering the wire-jointing method of a solderless terminal and electric wire pressure-welding equipment which raise the contact pressure of the pressure-welding edge after pressing fit, and moreover raise flow reliability.

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MEANS

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[Means for Solving the Problem] The wire-jointing method of the solderless terminal concerning this invention for attaining the above-mentioned purpose While tearing apart the covering section and aiming at flow connection with an internal core wire by pressing a cable fit in a pressure-welding edge In the wire-jointing method of the solderless terminal which carries out fixed connection of the aforementioned cable in total the electric wire attaching part which approached the aforementioned pressure-welding edge and were formed successively -- the covering section top of the aforementioned cable -- \*\* -- It is characterized by being able to shift the process and the aforementioned electric wire attaching part which press the aforementioned cable fit into the slot formed with the aforementioned pressure-welding edge, and performing [ the attaching part ] caulking \*\*\*\*\* for timing on the covering section of the aforementioned cable.

[0007] And in case performing pressing [ of a cable ] fit in advance of caulking of an electric wire attaching part in order to shift timing with caulking \*\*\*\*\* for the process and electric wire attaching part which press a cable fit according to the above-mentioned method, then a cable are pressed fit in a pressure-welding edge, the deformation prevention factor of the pressure-welding edge by the electric wire attaching part is canceled, and a pressure-welding edge follows pressing [ of a cable ] fit and is opened easily to the method of outside.

[0008] Moreover, the electric wire pressure-welding equipment concerning this invention for attaining the above-mentioned purpose The pedestal which supports a solderless terminal from a lower part, In the electric wire pressure-welding equipment which possesses the punch for caulking \*\*\*\*\* for the electric wire attaching part of the aforementioned solderless terminal approached and formed successively by the aforementioned pressure-welding edge on the covering section of the pressure-welding punch which descends from the upper part to the solderless terminal on a pedestal, and presses a cable fit in the pressure-welding edge of this solderless terminal, and the aforementioned cable It is characterized by for aforementioned pressure-welding punch preceding and descending to the aforementioned punch for caulking, and for the aforementioned punch for caulking descending still in the state in the state where the aforementioned cable was pressed fit in the pressure-welding edge, and performing caulking of the aforementioned electric wire attaching part.

[0009] and -- since it will deform so that a pressure-welding edge may open a little to the method of outside in connection with the insertion pressure at this time if according to the above-mentioned composition pressure-welding punch precedes and descends to the punch for caulking and presses a cable fit in a pressure-welding edge -- a core wire -- it can delete -- etc. -- it loses and a cable can be inserted in fitness to the slot deep part of a pressure-welding edge Moreover, after pressing [ of a cable ] fit, it is added so that the bending force by the side of the inner direction where the punch for caulking acts on a pressure-welding edge with an electric wire attaching part by \*\*\*\*\*'s at caulking of this electric wire attaching part may raise the contact pressure of a pressure-welding edge. Thereby, the pressure-welding edge which the solderless terminal opened comes to be returned to an initial state, and its contact reliability improves. Furthermore, the punch for caulking is \*\*\*\*\* about an electric wire attaching part still in the state in the state where pressure-welding punch pressed the cable fit. Thereby,

where the relief of the cable by pressure-welding punch is prevented, caulking \*\*\*\*\* can do a cable good, and the punch for caulking is \*\*.

[0010]

[Embodiments of the Invention] Hereafter, the wire-jointing method of the solderless terminal concerning this invention and the gestalt of suitable operation of electric wire pressure-welding equipment are explained in detail based on a drawing. Drawing 1 is the outline decomposition perspective diagram showing 1 operation gestalt of the electric wire pressure-welding equipment concerning this invention. In addition, this operation gestalt shall also explain the wire-jointing method of a solderless terminal based on the electric wire pressure-welding equipment concerning this invention. Moreover, to the same member as the conventional example, and a part, explanation is omitted using the same sign.

[0011] In drawing 1, electric wire pressure-welding equipment 10 equips the pedestal 1 which supports a solderless terminal 30, and the pressure-welding punch 3 and the punch 13 for caulking which descends from the upper part to the solderless terminal 30 on a pedestal 1, and connects a cable 40, and consists of lower parts.

[0012] A pedestal 1 is the plinth (female mold) whose installation of a solderless terminal 30 was enabled, and abbreviation coincidence is carried out at the undersurface configuration of a solderless terminal 30, and by the part corresponding to the electric wire attaching part 35 of a solderless terminal 30 at least, the upper surface 2 is formed in the curved surface what minute in order to make good the caulking configuration of the electric wire attaching part 35. In addition, by this example, the pedestal 1 is formed only in the size which can lay the pressure-welding edge 33 and the electric wire attaching part 35 of a solderless terminal 30 while being fixed. However, a pedestal 1 may be structure which supports the whole including the contact 31 (refer to drawing 4) of a solderless terminal 30. Moreover, a pedestal may be a size corresponding to the electric wire attaching part, and may be in the state with which the terminal hold room of connector housing which it is prepared possible [ movement ] and a solderless terminal does not illustrate was equipped, and may be structure which advances into the lower part position corresponding to the electric wire attaching part.

[0013] A solderless terminal 30 is equipped with two or more pairs of pressure-welding edges 33 which made a part of both right-and-left side attachment walls that made the metal plate the shape of a cross-section KO character by folding crooked in the inner direction as usual, and forms the slot 37 which tears apart the covering section 41 by pressing [ of a cable 40 ] fit between the tips of the pressure-welding edge 33 which counters mutually. Moreover, a solderless terminal 30 is equipped with the electric wire attaching part 35 which the pressure-welding edge 33 was approached [ attaching part ] and made the terminal back end section formed successively stand up possible [ bending of a right-and-left side attachment wall ].

[0014] Pressure-welding punch 3 is the punch which descends from the upper part to the solderless terminal 30 on a pedestal 1, and can press a cable 40 fit in the slot 37 of the pressure-welding edge 33, and two or more relief grooves 5 into which the pressure-welding edge 33 advances when it descends are installed successively toward the upper part in the position corresponding to the pressure-welding edge 33 from the inferior surface of tongue 9. Moreover, the press crevice 7 which presses a cable 40 in contact with the peripheral face of a cable 40 in an inferior surface of tongue 9 is installed in the relief groove 5 and the right-angled direction.

[0015] When the punch 13 for caulking descended from the upper part to the solderless terminal 30 on a pedestal 1, is caulking \*\*\*\*\* and descends the electric wire attaching part 35 of a solderless terminal 30 on the covering section 41 of a cable 40, it establishes the guidance wall 15 which bends the electric wire attaching part 35 to the inner direction gradually, and it is equipped with the crevice 17 of the shape of a mountain type which sticks the electric wire attaching part 35 by pressure on the covering section 41.

[0016] The pressure-welding punch 3 and the punch 13 for caulking which were mentioned above are formed independently possible [ movement ], respectively, in this example, pressure-welding punch 3 precedes characteristic composition of this operation gestalt with the punch 13 for caulking, and it

descends.

[0017] Next, with reference to both drawing 2 and drawing 3, the wire-jointing method of a solderless terminal and an operation are described. First, in the state where the cable 40 has been arranged above the solderless terminal 30 supported by the pedestal 1, pressure-welding punch 3 precedes and descends to the punch 13 for caulking, and electric wire pressure-welding equipment 10 presses a cable 40 fit to a slot deep part, as shown in drawing 2 (a). Thereby, the covering section 41 is torn apart with the pressure-welding edge 33, and, as for a cable 40, a core wire 43 is \*\*\*\*\* (ed) with the pressure-welding edge 33.

[0018] When this pressure-welding punch 3 descends, as shown in drawing 3 (a), the right-and-left side attachment wall of the part corresponding to this pressure-welding edge 33 comes to open the pressure-welding edge 33 a little to the method of outside with pressing [ of a cable 40 ] fit. By this, the pressure-welding edge 33 will have \*\*\*\*\* which is the grade which can tear apart the covering section 41 at the same time it makes penetration of a cable 40 ease. Therefore, \*\*\*\*\* of a core wire 43 and the pressure-welding edge 33 is performed good at the same time it can delete a core wire 43 and \*\*\*\*\* is prevented.

[0019] Subsequently, it bends so that it may be standing it still in the state in the state pressure-welding punch 3 having pressed the cable 40 fit, and the punch 13 for caulking descending, and making the nose of cam of the electric wire attaching part 35 \*\*\*\*\* in the 15th page of the guidance wall as shown in drawing 2 (b) and the electric wire attaching part 35 may be narrowed down inside gradually, and electric wire pressure-welding equipment 10 is \*\*\*\*\* on the covering section 41. Thereby, a solderless terminal 30 carries out fixed connection of the cable 40 firmly.

[0020] As this punch 13 for caulking descends and solves and it is shown in drawing 3 (b), the bending force inside the electric wire attaching part 35 joins the pressure-welding edge 33, and the pressure-welding edge 33 is closed to the inner direction. Thereby, the contact pressure which the pressure-welding edge 33 comes to be returned to an initial state from the state opened a little by pressing [ of a cable 40 ] fit, and contacts a core wire 43 comes to be raised. Therefore, the contact reliability of a solderless terminal 30 of the pressure-welding edge 33 improves. Moreover, since it was prepared with the downward state in which pressure-welding punch 3 pressed the cable 40 fit and the relief of a cable 40 is prevented when this punch 13 for caulking descends, as for the punch 13 for caulking, caulking \*\*\*\*\* can do a cable 40 good. In addition, you may be the structure which descends in [ both punch ] abbreviation simultaneous since \*\*\*\*\* timing should just be slightly shifted in the electric wire attaching part when this invention is not limited only to such a mode although it says that the punch for caulking descends after the state where explanation top and pressure-welding punch descended completely by the wire-jointing method of a solderless terminal, and pressing a cable fit in a pressure-welding edge in short.

[0021] Although stated by the wire-jointing method in the above-mentioned operation gestalt as composition which precedes a pressing process with a caulking process and performs the pressing process to the pressure-welding edge of a cable, and the caulking process by the electric wire attaching part, as long as a pressure-welding edge opens good in the case of a pressing process, this invention may not be limited to such process timing, and may be pressed fit after caulking. However, contact pressure recovery of the pressure-welding edge which acts in connection with caulking of an electric wire attaching part in this case is not expectable.

[0022]

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the outline block diagram of the electric wire pressure-welding equipment concerning this invention.

[Drawing 2] In drawing showing the procedure of the electric wire pressure-welding method by the electric wire pressure-welding equipment of drawing 1 , (a) shows operation before of the punch for caulking, and (b) shows the operation back of the punch for caulking.

[Drawing 3] In drawing showing the state of a pressure-welding edge corresponding to each process of drawing 2 , (a) shows the time of operation of pressure-welding punch, and (b) shows the time of operation of the punch for caulking.

[Drawing 4] It is the appearance perspective diagram of a solderless terminal.

[Drawing 5] It is drawing showing the conventional pressure-welding method.

[Drawing 6] It is drawing showing the appearance of the pressure-welding edge by the conventional pressure-welding method of drawing 5 .

[Drawing 7] It is drawing showing the situation of the electric wire attaching part by the conventional pressure-welding method of drawing 5 .

[Description of Notations]

1 Pedestal

3 Pressure-Welding Punch

10 Electric Wire Pressure-Welding Equipment

13 Punch for Caulking

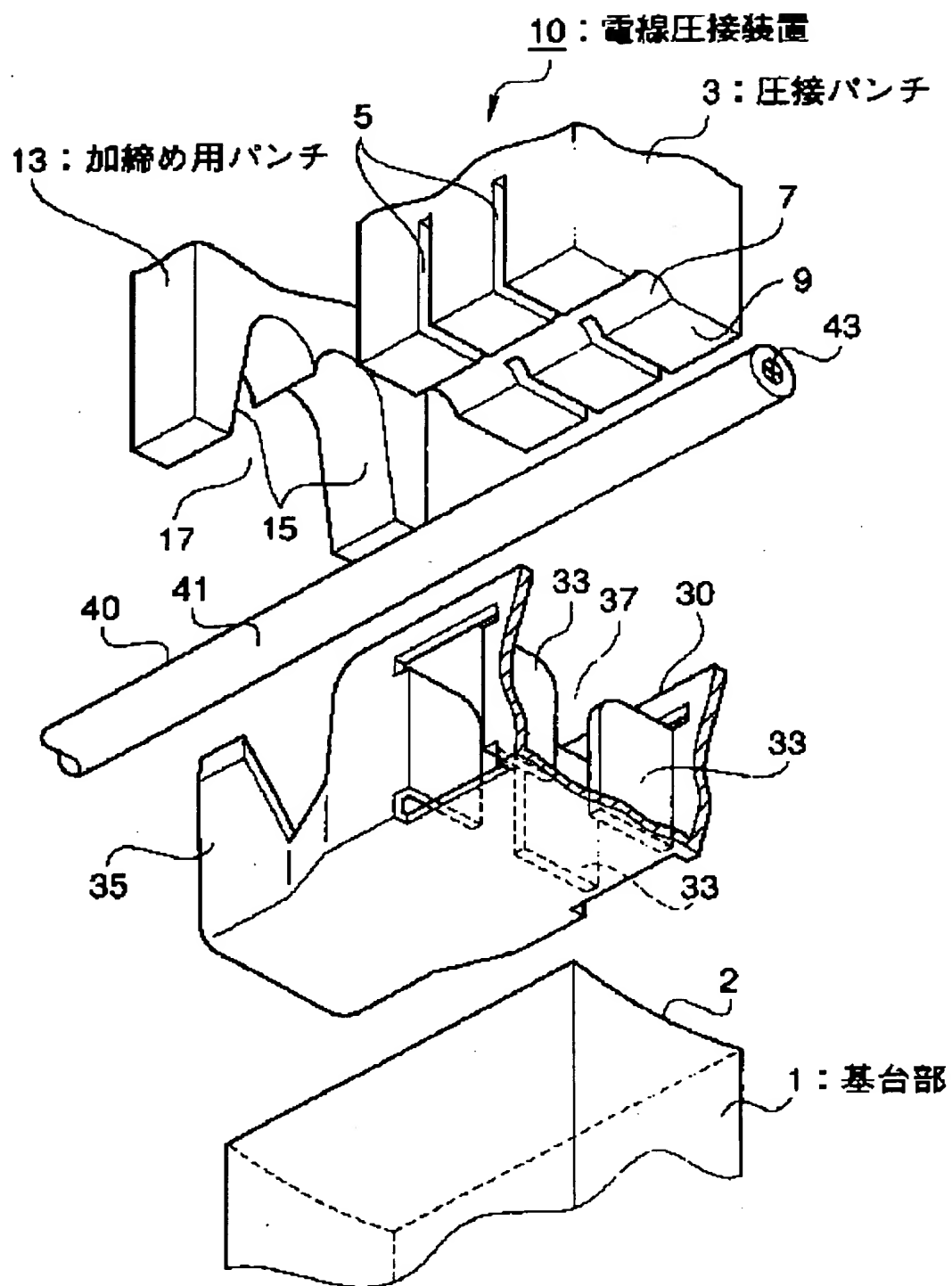
30 Solderless Terminal

40 Cable

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[Translation done.]







DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	JP 2000 058143 A (TORII CHIEKO) 25 February 2000 (2000-02-25)	1	H01R43/01
Y	* figure 1 *	2	H01R4/24
Y	EP 0 881 721 A (SUMITOMO WIRING SYSTEMS) 2 December 1998 (1998-12-02) * abstract; figures 1-3 *	2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H01R
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		11 July 2003	Corrales, D
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P : intermediate document			
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E : earlier patent document, but published on, or after the filing date			
D : document cited in the application			
L : document cited for other reasons			
& : member of the same patent family, corresponding document			

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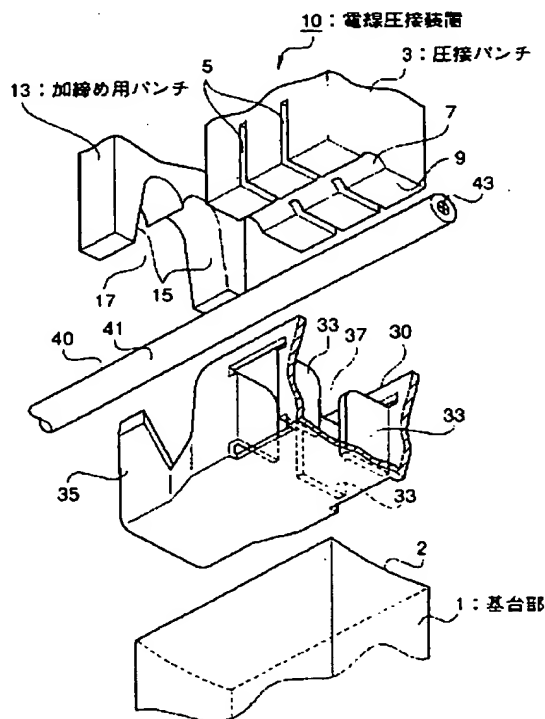
Fターム (参考) 5E012 AA14

(54) 【発明の名称】 圧接端子の電線接続方法および電線圧接装置

(57) 【要約】

【課題】 圧接端子の、被覆電線の圧入時に起こる芯線の削れや断線等の不都合を解消すると共に、圧入後の導通信頼性が得られる電線圧接装置を得る。

【解決手段】 被覆電線40を、基台1上に支持した圧接端子30の圧接刃33に圧入する圧接パンチ3が、前記圧接端子30の電線保持部35を被覆電線40の被覆部41上加締め用加締め用パンチ13に先行して下降して被覆電線40に作用する。



て容易に外方へ開かれる。

【0008】また、上記目的を達成するための本発明に係る電線圧接装置は、下方より圧接端子を支持する基台部と、基台部上の圧接端子に対して上方より下降して被覆電線を該圧接端子の圧接刃に圧入する圧接パンチ及び前記被覆電線の被覆部上に前記圧接刃に近接しかつ連設された前記圧接端子の電線保持部を加締める加締め用パンチとを具備する電線圧接装置において、前記圧接パンチが前記加締め用パンチに先行して下降し、前記被覆電線を圧接刃に圧入した状態のまま前記加締め用パンチが下降して前記電線保持部の加締めを行うことを特徴とする。

【0009】そして、上記構成によれば、圧接パンチが加締め用パンチに先行して下降して被覆電線を圧接刃に圧入すると、このときの圧入力に伴って圧接刃が外方へ若干開くように変形するので、芯線の削れ等を無くして被覆電線を圧接刃のスロット深部まで良好に挿入できる。また、被覆電線の圧入後、加締め用パンチが電線保持部を加締めるので、この電線保持部の加締めに伴って圧接刃に作用する内方側への折曲力が圧接刃の接圧を高めるように付加される。これにより、圧接端子の開いた圧接刃は初期状態に戻されるようになって接触信頼性が向上される。さらに、圧接パンチは被覆電線を圧入した状態のまま、加締め用パンチが電線保持部を加締める。これにより、加締め用パンチは、圧接パンチによる被覆電線の浮き上がりが防止された状態で、被覆電線を良好に加締めることができ。

【0010】

【発明の実施の形態】以下、本発明に係る圧接端子の電線接続方法および電線圧接装置の好適な実施の形態を図面に基づいて詳細に説明する。図1は本発明に係る電線圧接装置の一実施形態を示す概略分解斜視図である。なお、本実施形態では、本発明に係る電線圧接装置に基づいて圧接端子の電線接続方法も説明するものとする。また、従来例と同一部材、部位には同一符号を用いて説明を省略する。

【0011】図1において、電線圧接装置10は、下方より圧接端子30を支持する基台部1と、基台部1上の圧接端子30に対して上方より下降して被覆電線40を接続する圧接パンチ3および加締め用パンチ13とを装備して構成される。

【0012】基台部1は、圧接端子30を載置可能にした台座（下型）で、その上面2が、圧接端子30の下面形状に略一致し、少なくとも圧接端子30の電線保持部35に対応した部位では、電線保持部35の加締め形状を良好にするため幾分曲面に形成されている。なお、基台部1は、本例では、固定されると共に圧接端子30の圧接刃33および電線保持部35を載置できるだけの大きさに設けてある。しかし、基台部1は、圧接端子30のコンタクト31（図4参照）を含む全体を支持する構

造であってもよい。また、基台部は、電線保持部に対応した大きさで、かつ、移動可能に設けられ、圧接端子が図示せぬコネクタハウジングの端子収容室に装着された状態で、電線保持部に対応した下方位置に進入する構造であってもよい。

【0013】圧接端子30は、従来と同様、金属板を折曲加工により断面コ字状にした左右側壁の一部を共に内方に屈曲させた複数対の圧接刃33を備え、互いに対向する圧接刃33の尖端間で、被覆電線40の圧入によって被覆部41を切り裂くスロット37を形成している。また、圧接端子30は、圧接刃33に近接し、かつ、連設された端子後端部に、左右側壁を折曲可能に起立させた電線保持部35を備える。

【0014】圧接パンチ3は、基台部1上の圧接端子30に対して上方より下降して被覆電線40を圧接刃33のスロット37内に圧入できる上型で、下降した際に圧接刃33が進入する複数の逃げ溝5が、圧接刃33に対応した位置で下面9より上方に向かって列設されている。また下面9には、被覆電線40の外周面に当接して被覆電線40を押圧する押圧凹部7が逃げ溝5と直角方向に延設されている。

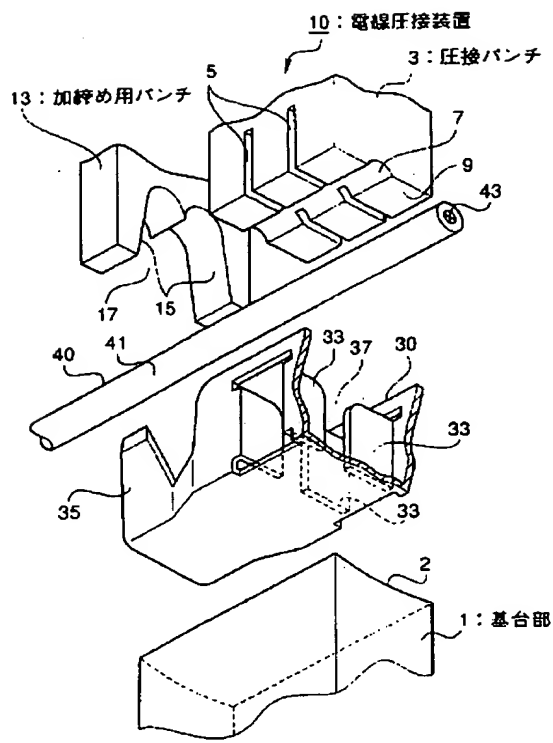
【0015】加締め用パンチ13は、基台部1上の圧接端子30に対して上方より下降して被覆電線40の被覆部41上に圧接端子30の電線保持部35を加締める上型で、下降した際に電線保持部35を徐々に内方へ折り曲げる案内壁15を設けて、電線保持部35を被覆部41上に圧着する山形状の凹部17を備える。

【0016】本実施形態の特徴的構成は、上述した圧接パンチ3および加締め用パンチ13がそれぞれ独立して移動可能に設けられており、本例では、圧接パンチ3が加締め用パンチ13に先行して下降するようになっている。

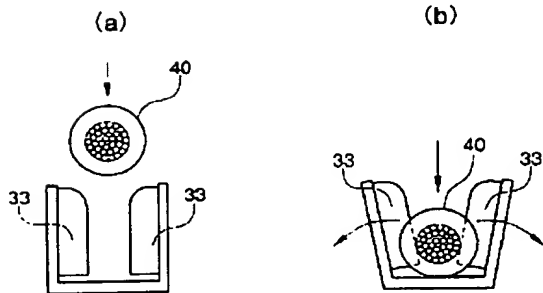
【0017】次に、図2、図3を共に参照して圧接端子の電線接続方法および作用について述べる。まず、被覆電線40を、基台部1に支持された圧接端子30の上方に配置した状態で、電線圧接装置10は、図2(a)に示すように、圧接パンチ3が加締め用パンチ13に先行して下降して、被覆電線40をスロット深部まで圧入する。これにより、被覆電線40は被覆部41が圧接刃33によって切り裂かれて芯線43が圧接刃33と導接される。

【0018】この圧接パンチ3が下降したとき、図3(a)に示すように、圧接刃33は、この圧接刃33に対応した部位の左右側壁が、被覆電線40の圧入に伴って外方へ若干開くようになる。これにより、圧接刃33は、被覆電線40の進入を緩和させると同時に、被覆部41を切り裂くことができる程度の弾接力を有することになる。従って、芯線43の削れや断線が防止されると同時に、芯線43と圧接刃33との導接が良好に行われる。

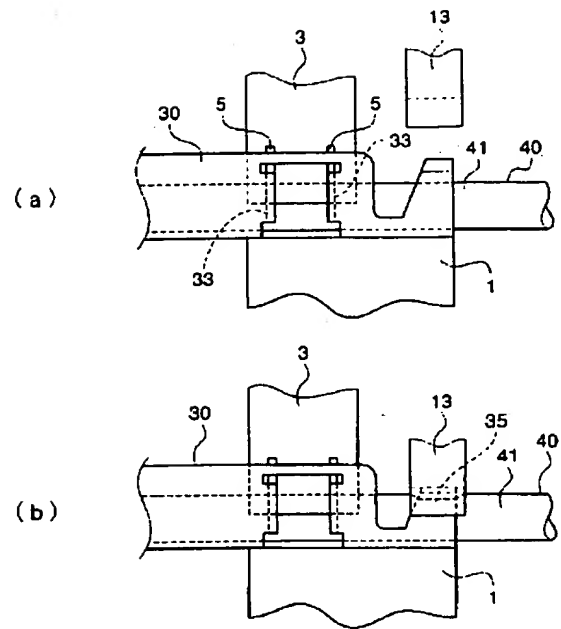
【図1】



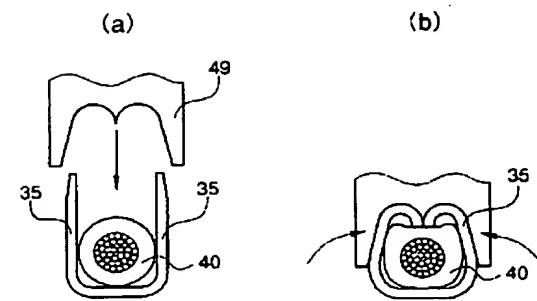
【図6】



【図2】



【図7】



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